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ABSTRACT

American college students (N=46) were asked to assign grades to a series of words and phrases used in describing college work. The variables of sex, GPA and cognitive/semantic consistency were correlated with 30 descriptor words. The results revealed that the first canonical root was significant. Using regression to explore individual patterns, it was found that all three independent variables of sex, self-reported grade point average, and cognitive/semantic consistency affected the grades thought to be associated with the descriptors. Males perceived the wood "poor" to be significantly more positive than did females. Higher grade point averages led to a more positive evaluation of the words "graduate quality." Finally, "poor," "outstanding," and "passing" were all more favorably rated by those who exhibited greater cognitive/semantic consistency. What is abundantly clear from these data is that the words used to describe achievement in a college classroom are subject to systematic confusion depending on gender, GPA and cognitive/semantic consistency of the receiver/students. Given the sample size for this study (42 respondents), the trends in these data portend differences which could only be called gigantic. This line of research should be further pursued. (A table is included. Contains six references.) (Author/TB)

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WHAT DO GRADES MEAN?:
A PILOT STUDY USING SEX, GPA AND COGNITIVE/SEMANTIC CONSISTENCY

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Abstract

American college students (N = 46) were asked to assign grades to a series of words and phrases used in describing college work. The variables of sex, GPA and cognitive/semantic consistency were correlated with 30 descriptor words. The results revealed the first canonical root was significant (R_c = .977; Eigenvalue = 20.86; Approximate F = 2.22; df = 33.79; p < .005). Using regression to explore individual patterns, it was found that all three independent variables of sex, self-reported grade point average and cognitive/semantic consistency affected the grades thought to be associated with the descriptors. Males perceived the word "poor" to be significantly more positive than did females. Higher grade point averages lead to a more positive evaluation of the words "graduate quality." Finally, "poor," "outstanding" and "passing" were all more favorably rated by those who exhibited greater cognitive/semantic consistency.

WHAT DO GRADES MEAN?:
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One of the favorite story lines in science fiction concerns a typical American male seen at the beginning of a typical day. He arises and moves to the breakfast table where his wife casually asks if he would like another piece of "zebra." He responds "zebra?" Holding a piece of toast, she says in a matter of fact tone of voice "Yes, zebra." Before leaving for work, his small daughter announces that she has learned to read a new word. The girl opens her primer revealing a picture of a cow. Under the cow is printed the word "Nevertheless." Proudly, the girl says "See Daddy, nevertheless." Over the next few weeks the world begins to subtly change in front of our eyes. It is almost as if the meanings in a dictionary have been dumped into one box and all the words have been dumped into another box. Randomly, the meanings are drawn from the first box and assigned to another random draw from the second box. By the end of the story, the man is being taught to speak this new language.

But suppose this story is not as fictional as we might think. Is it possible that misunderstandings of precisely this sort are not only possible but that they are frequent? This general query is the driving force behind this study.

Overview

In the theoretical sense what does it mean when we say that

"we communicate?" One way to answer that question is to realize that communication begins with the process of perception. Communication rests on the assignation of observable phenomenon into categories of meaning. When we visit a home and sit down at the table for a meal, it is immaterial that a dish is being served which we have never before eaten. When the bowl is passed, we are capable of inferring that the contents of the bowl are meant to be eaten. We have assigned an occurrence (something is in that bowl being passed to me) to a meaning category (I should probably put some on my plate).

On the other hand, communication between two people is not complete until and unless the other person has received and interpreted in a reasonably similar fashion that which we intended to transmit. We might even say that communication is the coorientation of two persons seeking to arrive at a common set of cognitive categorizations. The degree to which one person's assignation of a phenomenon into a category is the same as the other person's assignation of the same phenomenon into the same category is the degree to which the two persons are said to understand each other. Where then does communication go wrong?

Perhaps the best way to begin is to recognize that communication problems are unlikely to occur unless the matter at hand is one of concern for both parties. In a social situation for example, if another person utters some sequence of words which seem unintelligible, we are likely to ignore them unless

the words have some sort of relevance for us. It is impolite to press another too much on questions of semantics and perhaps s/he will make further comments which will clarify the intended meaning without exposing the fact the we have no idea what is being discussed. In polite social situations this passive solution probably works rather well. In more involving encounters, more direct action may be required.

Suppose we have a situation in which one person contends that a phenomenon belongs in one category while the other contends the same phenomenon belongs in a different category. Moreover, the classification of this phenomenon is a matter of concern to both. This description is, of course, a perfect example of the dispute in which the student contends a submitted paper is an "A" while the professor contends that the same paper is a "B". Setting aside the issue of who wins and who loses, the dispute is worth examining further. Is the disagreement really about the paper or is it about a much more fundamental matter? Could it be that the student and the professor are actually disagreeing over what constitutes the appropriate phenomenon to be classified into the categories of "work to be considered an A" and "work to be considered a B"? If this is the real basis for the dispute, the paper is an almost trivial concern. Seen in this light, the dispute depends on the conceptual parameters of the category systems for the two parties. Once the categories have been defined, the

classification of the paper is routine.

Past research

It is a bit surprising that more research has not been conducted concerning the connotative meanings of grades for students. As early as 1976 McKeachie published a rationale which emphasized, in part, that grades are a form of communication. Moreover, he clearly identified an implication of the position that grades are communication by asserting that what a teacher communicates will directly depend on the meaning of the grade to the person receiving the grade (McKeachie, 1976). Scant attention seems to have been directed towards this question of individual meanings.

Using a semantic differential for measurement Eiszler and Stancato (1979) did discover that students appear to have at least four independent dimensions on which grades are categorized: evaluation, realism, complexity and salience. Later, Eiszler and Stancato (1981) found that the feeling when getting a grade of C seemed to be related to whether or not the course was aimed at majors or nonmajors and then only for the effort required. This finding was especially pronounced in the sciences. More insight was provided by Stancato and Eiszler (1983) when it was found that college students appear to categorize grades on an elastic scale. That is, the distance between grading increments is not equal.

This last finding (Stancato & Eiszler, 1983) clearly

suggests that different persons seem to have different standards of categorization and the earlier study (Eiszler & Stancato, 1981) suggests that these standards are subject to contextual circumstances. These two notions, added together, form the nexus for the present investigation.

It may well be the case that students have systematically different category systems which covary across a variety of dimensions. For example, given the differing socialization patterns for males and females we might suspect that the meaning of grades could easily covary by sex. In addition, the fact remains that some students achieve academic success more easily than do others. This consistent reinforcement must, in the long run, have some sort of impact on not only grades but on one's orientation to the entire educational process. Finally, the discovery that the meaning of grades is conceptualized on an elastic scale is intriguing but not instructive. Is there a rationale which could account for this elasticity?

In fact, these concerns form the basis for the present investigation. The research question of this study is: do the meanings for grades differ by gender, achieved grade point and levels of cognitive/semantic consistency?

Method

The present study was administered to a sample (N = 46) of American college students at a large Mid-Atlantic university as part of a class exercise. They were told,

"As you know, feedback on papers and themes is not always as complete as it might be. For purposes of this study, assume that a paper or theme has been graded and the only mark on the assignment is a word or phrase; unfortunately, the letter grade was accidentally omitted. If you were to see each of the words listed below, what letter grade would you anticipate would be awarded to the paper?"

Following these instructions, the following descriptive words were listed in alphabetical order: above average, abysmal, awful, average, barely passing, confused, decent, excellent, failing, fair, good, graduate quality, insightful, mediocre, missed the point, needs improvement, OK, ordinary, outstanding, passing, poor, satisfactory, so so, sound work, splendid, superior, unsatisfactory, very good, very poor and wonderful.

After they completed this portion of the task, the respondents were asked to indicate their gender and grade point.

Cognitive/semantic consistency

The cognitive consistency of categorization was measured by observing that a number of categories could be logically ordered. For example, it should be the case that: above average > average; satisfactory > unsatisfactory; poor > very poor; passing > failing; barely passing > failing; passing > barely passing and very good > good. The highest possible score on this scale would be a 7, one point being given for each comparison which matched

the logical ordering of the categories. The lowest possible score would be a zero. The observed scores ranged from a high of 7 to a low of 4. The mean was 5.63 with a standard deviation of .97.

Results

Perhaps the first order of business is to ascertain to what extent, if any, the criterion variables might be redundant. An examination of the correlations among the variables of cognitive/semantic consistency, GPA and sex revealed no significant correlations. It would be premature to assert that these measures are not somehow related to one another but if such relationships do exist they are not sufficiently powerful to emerge in this data set.

The initial data inspection revealed that two of the descriptive variables would be of little use. Every single respondent agreed that "failing" was an F. Since this variable was a constant, it was eliminated from the analysis. Further, the descriptor variable of "abysmal" was omitted by a fifth (9 of 46) of the sample and it was clearly misunderstood by a good many others--one respondent awarded it a B. To have included this variable in the analysis would have been to deliberately introduce error variance into the study. It too was eliminated.

As is typical, the computer program to perform canonical correlational analysis discarded any case in which missing data was encountered. Of the 46 cases, 4 were eliminated leaving an

effective sample size of 42. All calculations are based on this N.

Armed with this knowledge, the 28 remaining descriptors were subjected to canonical correlational analysis using the criterion variables as the dependent set and the descriptor variables as the independent set. The results revealed only the first canonical root was significant (R_c = .977; Eigenvalue = 20.86; Approximate F = 2.22; df = 33.79; $p < .005$).

Insert Table 1 about here

Several writers have been critical of the practice of interpreting the standardized canonical coefficients as if they were beta weights (Muliak, 1972; Tucker & Chase, 1980). Both these sources have recommended that the interpretations be made using the correlations of the dependent variables with the canonical variable(s). As Muliak (1972) has pointed out, these correlations "may be interpreted as one interprets factor loadings" (pg. 422). That procedure will be followed here.

However, the analysis is not so easily accomplished. The canonical root indicates that the three independent variables are significantly related to the 28 descriptors in multidimensional space but it does not tell the tale of how these relationships function. In the same sense in which a significant MANOVA leads

to a "dredging operation" using the univariate ANOVA, we propose to use a standard multiple regression to unearth the relationships imbedded in the canonical root. In advance, only those relationships with correlations (read as: loadings) of .30 or higher will be considered. This is the same criteria as one would ordinarily use in a factor analytic study.

Regression analyses

The variable of sex yielded only a single correlation before the regression ended. The descriptor "poor" was the only significant correlation for this solution (r = .42; F (1,33) = 7.18; $p < .01$). With the variable of sex coded as 1 for males and 0 for females, it is clear that males perceived this descriptor as being significantly more positive than did females.

Reported grade point (GPA) also produced a one variable solution. In this case, the descriptor "graduate quality" was the only significant variable in the equation (r =.30; F (1,33) = 6.07; $p < .02$). As reported grade point increased so did the perceived grade awarded to the words "graduate quality."

The richest solution was spawned for cognitive/semantic consistency. This regression yielded a 6 variable solution; however, only the first three variables met the criteria of .30 or higher using the correlations of the dependent variables with the canonical variables. The first descriptor in the equation was "poor" (Beta = .43) followed by "outstanding" (Beta = .43) and ending with "passing" (Beta = .40). These three variables

produced a multiple correlation which explained over 50% of the variance in cognitive/semantic consistency (R =.73; F (3,31) = 12.02; p < .000).

Discussion

To emphasize the multivariate nature of these results, it should be noted before beginning the discussion that several variables having acceptable correlations/loadings (Table 1) did not emerge in the univariate analysis at all. Notable among these were: above average (.35), good (.34), and sound work (.30). This observation suggests that there are some interactions at work which the univariate analysis is incapable of capturing.

It is also worth repeating that not one of these criterion variables was significantly related to either of the others. It is not the case that we are examining the same variables numerous times.

The most easily explainable finding from the univariate regression was the relationship of GPA to the meaning of "graduate quality." It seems reasonable that as a student's grade point increases s/he would come to realize the meaning of work which might qualify for graduate level credit.

It is also no surprise that cognitive/semantic consistency should emerge as the most useful criterion variable of the analysis. Reflection reveals that it is the sine qua non of misunderstand to confuse the order of passing and barely passing

or of above average and average. Persons who cannot distinguish between the order of these categories could easily have problems in assigning values to other categories. While only future research will tell, it may easily be the case that classification confusion of this sort may lie at the heart of many communication problems. The most interesting observation concerning cognitive/semantic consistency is that it is virtually unrelated to GPA ($r = -.04$). In so far as GPA is a measure of one's capacity for achievement, the fluidity of classification categories for meaning is not related to that capacity.

On the other hand, the reoccurrence of "poor" for both gender and GPA raised the possibility that either males or females might somehow be more or less semantically consistent. This suspicion was dispelled with the observation of a nonsignificant relationship between the two variables ($r = -.15$; p is n.s.). The import of "poor" in this analysis remains, for the moment, clouded.

Coda

What is abundantly clear from these data is the fact that the words used to describe achievement in a college classroom are subject to systematic confusion depending on the gender, GPA and cognitive/semantic consistency of the receiver/students. This last sentence is all the more underscored by the fact that this pilot study was based on an effective sample size of 42 respondents. In order for the results to achieve the levels of

significance found here, the trends in these data portend differences which could only be called gigantic. Based on these data, there appears to be every reason to pursue this line of research. The present study powerfully supports the contention of McKeachie (1976) that grades are communication. The task now seems to lie in finding a translation in which it is possible for the parties to transfer meaning. Perhaps the science fiction context described at the beginning of this paper contains much less fiction than we had imagined.

Table 1

Standardized Canonical Coefficients and correlations of descriptor variables with their canonical variables

Descriptors	Standardized Canonical Coefficients	Correlations between Descriptors and their canonical variables
above average	.41	.35
awful	.07	.04
average	.51	.15
barely passing	.25	.20
confused	-.15	-.06
decent	-.04	.14
excellent	.11	.00
fair	-.22	.00
good	-.09	.33
graduate quality	-.05	.31
insightful	.12	.18
mediocre	-.31	.02
missed the point	.18	-.02

needs improvement	.26	.05
OK	-.07	.09
ordinary	.03	.01
outstanding	-.04	-.31
passing	-.63	-.45
poor	-.33	-.30
satisfactory	.08	-.15
so so	.04	.15
sound work	.08	.28
splendid	.79	.09
superior	-.14	-.10
unsatisfactory	.42	.14
very good	-.73	-.23
very poor	.13	.23
wonderful	.01	-.08

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